CLAIMS

What Is Claimed Is:

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1. A proximity detection circuit comprising:

an asymmetric oscillator circuit having its on-period set by a resistor network comprising a plurality of fixed resistors and at least one variable resistor and having its off-period set by at least one fixed resistor and by at least one first single diode;

a first static protection circuit comprising a first plurality of diodes, one said diode adapted to conduct away from ground, another said diode adapted to conduct toward the supply voltage;

a reset path wherein a second single diode provides a discharge path for an antenna wherein said antenna is discharged to the same voltage for every time period;

the asymmetric oscillator being adapted to send an approximately uniform amount of charge during its on-period to said antenna;

the antenna voltage being decreased when the capacitance of the antenna is increased by a detected object;

a second static protection circuit comprising a second plurality of diodes, one said diode adapted to conduct away from ground, another said diode adapted to conduct toward the supply voltage;

an antenna impedance buffer comprising operational amplifier operated as a unity gain follower with the output terminal of said operational amplifier being fed back to the inverting input terminal;

a voltage peak detector comprising a third single diode, a current-limiting resistor, a peak storage capacitor and a bleed off resistor, said third single diode and said peak storage capacitor being adapted to capture the positive peak of the exponential waveforms, said current limiting resistor being adapted to limiting current flow and

to providing said antenna impedance buffer output with more phase margin to prevent oscillation, said bleed-off resistor adapted to providing a discharge pathway for said peak storage capacitor;

a low-pass filter adapted to filter out about 50 or about 60 Hz alternating current interference frequencies, said low-pass filter comprising an in-line resistor and a capacitor with one side tied to ground;

an amplifier with gain and voltage offset;

an auto-compensation capacitor adapted to filter out changes in DC voltage levels of signals while allowing transient signals to pass through;

a three-position switch adapted to provide three levels of detection sensitivity; and

an output comparator adapted to generate an output on signal when the signal voltage, applied to the non-inverting input terminal of said comparator, is greater than the reference voltage, which is applied to the inverting input terminal of said comparator.

2. The circuit as in claim 1 wherein said detected object comprises a material with a dielectric constant at least equal to one-half the dielectric constant of water.

3. The circuit as in claim 1 wherein said transient signal is generated by a moving hand.

4. The circuit as in claim 1 further comprising:

a motor activation switch connected to receive an output of a flip-flop activated by said output signal of said output comparator.

5. A proximity detection circuit comprising:

an oscillator circuit comprising a first comparator adapted to provide an asymmetric signal as input to an antenna sensor;

an antenna sensor adapted to respond to a change in dielectric constant in said sensor's proximity;

a first operational amplifier adapted to buffer said antenna sensor to a peak detector wherein said antenna sensor has high impedance and said peak detector has low impedance;

a low pass filter adapted to filter out line noise frequencies in the 50 Hz and 60 Hz line ranges;

a second operational amplifier adapted to provide voltage offset to an input signal to said second operational amplifier and to amplify a signal from said peak detector as output from said second operational amplifier;

a second comparator adapted to produce an output pulse wherein said output signal from said second operational amplifier is an input signal to said second comparator and is of sufficient duration, amplitude and speed of change to produce said output pulse .

6. A method for detecting small capacitance changes comprising the steps of:

detecting time of charge integration for an antenna detector with a larger dielectric constant; and

integrating a peak voltage proportional to said charge integration time wherein said charge integration time is inversely proportional to the resistance-capacitance time constant;

producing an output signal from a peak voltage pulse integration;

said output signal being adapted to activate a motor-controlling logic circuit.

7. The method as in claim 6 further comprising the step of:

activating a motor switch when detecting a change in the output state of the flip-flop.

8. A method for detecting small capacitance changes, utilizing a proximity detection circuit, comprising the steps of:

producing an asymmetric oscillator circuit having its on-period set by a resistor network comprising a plurality of fixed resistors and at

least one variable resistor and having its off-period set by at least one fixed resistor and by at least one first single diode;

providing protection from static utilizing a first static protection circuit comprising a first plurality of diodes, one said diode adapted to conduct away from ground, another said diode adapted to conduct toward the supply voltage;

resetting an antenna sensor voltage to a fixed amount utilizing a a reset path wherein a second single diode provides a discharge path for an antenna wherein said antenna is discharged to the same voltage for every time period;

charging up an antenna with an antenna voltage wherein an approximately uniform amount of charge is sent by the asymmetric oscillator during its on-period to said antenna;

having said voltage lower when the capacitance of the antenna is increased by a detected object with a relatively high dielectric constant;

protecting against static in the proximity detector by utilizing a second static protection circuit comprising a second plurality of diodes, one said diode adapted to conduct away from ground, another said diode adapted to conduct toward the supply voltage;

impedance buffering with an antenna impedance buffer wherein said buffer comprises a unity gain operational amplifier with the output terminal of said operational amplifier being fed back to the inverting input terminal;

detecting a peak voltage utilizing a detector which comprises a third single diode, a current-limiting resistor, a peak storage capacitor and a bleed off resistor;

capturing the positive peak of the exponential waveforms utilizing said third single diode and said peak storage capacitor to capture the positive peak of the exponential waveforms;

limiting current flow utilizing said current limiting resistor to limit current;

preventing oscillation by providing said antenna impedance buffer output with more phase margin, by utilizing resistance of said current limiting resistor;

providing a discharge pathway for said peak storage capacitor utilizing a bleed resistor;

filtering out about 50 Hz and about 60 Hz alternating current interference frequencies utilizing a low-pass filter, said low-pass filter comprising an in-line resistor and a capacitor with one side tied to ground;

providing voltage offset;

amplifying signal with an operational amplifier;

filtering out changes in DC voltage levels of signals while allowing transient signals, as generated by a waving hand, to pass through;

providing three levels of detection sensitivity utilizing a three-position switch;

generating an output on signal, utilizing an output comparator, when the signal voltage, applied to the inverting input terminal of said comparator, is less than the reference voltage, which said reference voltage is applied to the inverting input terminal of said comparator.

9. The method as in claim 8 further comprising the step of:

applying the output voltage at the output pin of the second comparator to a an edge triggered control logic circuit.

10. The method as in claim 9 further comprising the step of:

activating a motor switch when detecting a change in the output state of the second comparator.

11. An apparatus for dispensing paper from rolls, comprising:

means for holding and positioning at least first and second rolls of paper with respect to each other;

means for dispensing paper from the first roll;

means for dispensing paper from the first and second rolls simultaneously when the first roll reduces to a predetermined diameter of paper;

means for positioning the depleted first roll for replacement without the necessity of removing the second roll;

means for dispensing from the second and replacement rolls simultaneously when the second roll reduces to a predetermined diameter of paper. and

a second proximity detector adapted to trigger the dispensing means when a user's hand is positioned within the field of the sensor.

12. The apparatus as in claim 11, the second proximity detector further comprising:

an oscillator circuit comprising a first comparator adapted to provide an asymmetric signal as input to an antenna sensor;

an antenna sensor adapted to respond to a change in dielectric constant in said sensor's proximity;

a first operational amplifier adapted to buffer said antenna sensor to a peak detector wherein said antenna sensor has high impedance and said peak detector has low impedance;

a second operational amplifier adapted to provide voltage offset to an input signal to said second operational amplifier and to amplify a signal from said peak detector as output from said second operational amplifier;

a second comparator adapted to produce an output pulse wherein said output signal from said second operational amplifier is an input signal to said second comparator and is of sufficient duration, amplitude and speed of change to produce said output pulse .

13. A dispenser for a paper web roll, comprising:

a first support adapted to hold a first roll of a paper;

a second support adapted to hold a second roll of a paper;

a third support rigidly connected to first and second support wherein said third support is rotatable about an axis;

a transfer bar wherein paper from said second roll can be fed with paper from the first roll to dispense together;

a second proximity detector adapted to trigger the dispensing of paper when a user's hand is positioned within the field of the sensor, the detector comprising:

an oscillator circuit comprising a first comparator adapted to provide an asymmetric signal as input to an antenna sensor;

an antenna sensor adapted to respond to a change in dielectric constant in said sensor's proximity;

a first operational amplifier adapted to buffer said antenna sensor to a peak detector wherein said antenna sensor has high impedance and said peak detector has low impedance;

a low pass filter adapted to filter out line noise frequencies in the 50 Hz and 60 Hz line ranges;

a second operational amplifier adapted to provide voltage offset to an input signal to said second operational amplifier and to amplify a signal from said peak detector as output from said second operational amplifier;

a second comparator adapted to produce an output pulse wherein said output signal from said second operational amplifier is an input signal to said second comparator and is of sufficient duration, amplitude and speed of change to produce said output pulse .

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14. The dispenser as in claim 13 further comprising means for providing a selectable dispensed paper length, said means comprising:

motor means for dispensing paper from at least one roll;

a first motor control sub-circuit;

a first switch adapted to control the first sub-circuit,

the first sub-circuit being adapted to set the length of paper dispensed by said motor means according to the setting of the first switch.

15. The dispenser as in claim 13 further comprising means for providing a selectable time delay before dispenser can be reactivated to dispense another length of paper, said means comprising:

motor means for dispensing paper from at least one roll;

a second motor control sub-circuit;

a second switch adapted to control the second sub-circuit,

the second sub-circuit being adapted to set a time delay for paper dispensed by said motor means according to the setting of the second switch.

16. The dispenser as in claim 13 further comprising means for providing a selectable sensitivity of said proximity sensor, said means comprising:

a voltage divider in a leg of a reference voltage;

a third switch adapted to select resistor combinations in said reference voltage leg,

said selected resistors being adapted to set sensitivity of said proximity sensor.